B A N G L A D E S H

Nutritional Surveillance Project

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Nutrition and Health Surveillance in Dhaka Division

Key results for the period: February 2001 to January 2002

Rural Bangladesh achieved a steady decline in malnutrition during the last decade but there are still millions of malnourished children and mothers leading impoverished lives. Since its inception in 1990 the HKI/IPHN Nutritional Surveillance Project (NSP) has been a source of high quality data on nutrition, health, socio-demography, food security and poverty in rural areas of all six divisions in the country. This bulletin presents NSP data collected in 2001 from rural areas in Dhaka Division. According to international criteria, malnutrition was a 'very high', 'serious' and even 'critical' public health problem in children and mothers at different times of the year. About one quarter (26%) of households had an energy intake <1805 kcal/person/d, an indicator of 'extreme' poverty, while the prevalence of anemia in children (54%) was higher than all other divisions and indicated a 'serious' problem. Investing in nutrition is crucial because malnutrition contributes to poverty and impedes both social and economic development.

The prevalence of malnutrition in Bangladesh is amongst the highest in the world. Although there is an increasing magnitude of problems among the urban poor, 77% of the population still resides in rural areas, where most lack adequate access to food, health care and other basic needs. The Government of Bangladesh, donors and development agencies recognise that malnutrition is a major barrier to poverty alleviation and development in Bangladesh and warrants effective action. In order to design, monitor and evaluate policies and programs, detailed information on the magnitude and determinants of the problem is needed.

Information generated by the NSP over the past 12 years has helped inform policymakers, program managers and donor organizations on many development concerns in Bangladesh including health, nutrition, food security, gender disparities, and poverty. HKI encourages the use of its surveillance data to facilitate policy and program action for the benefit of the population from whom they were collected. Following the successful experience of the HKI Nutrition and Health Surveillance System (NSS) in data sharing in Indonesia, the data collected by the NSP in Bangladesh in 2001 on key indicators of nutrition, health and their determinants are included in a CDROM that accompanies this series of bulletins.

Data collection in Dhaka Division

Data are collected every 2 mo in rural areas of four sub-districts (*upazila*) in Dhaka Division: Sreepur, Jamalpur Sadar, Serajdikhan and Atpara. These four sub-districts were randomly selected when the new sampling design was introduced in February 1998, and provide data that are statistically representative of the division. A new sample of 1,500 households is randomly selected from the total of four sub-districts during each round of data collection as follows. Fifteen *mauza* (administrative unit within a sub-district) are randomly selected from each sub-district. One village is randomly selected from each *mauza*, and 25 households with at least one child aged <5 years are systematically sampled from each village. A

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precoded questionnaire is used to record data from each household on the health and nutrition of one mother and all her children aged <5 years; household demography and socio-economic status; household food consumption; household food production; natural disasters, household crises and coping strategies; and participation in NGO programs.

Data are also collected from the five other divisions of the country: Barisal, Chittagong, Khulna, Rajshahi and Sylhet. The data from all six rounds of data collection in the six divisions are aggregated to provide a nationally representative sample of 54,000 rural households each year.

Findings presented

In this bulletin, data are presented on a selection of indicators of household demographic and socio-economic status, household food security (loans for food and homestead gardening), caring practices (breastfeeding), the performance of national health programs (vitamin A capsule distribution), food consumption (household energy intake and consumption of non-cereal foods), health status (child and maternal diarrhea) and nutritional status (child and maternal nightblindness, anemia and anthropometry). The definition and method of data collection of each indicator are described together with the general findings for rural Bangladesh and the specific findings for Dhaka Division. The figures show the data collected in Dhaka Division. While the scope of this bulletin is limited to presenting the findings, they serve to facilitate discussion on the immediate and underlying causes of malnutrition and on ways to address it.

Demographic and socio-economic status (See Table)

What is indicated. The demographic and socio-economic status of a household determines the extent to which the household unit can adequately feed and care for all members, provide a healthy environment and gain access to heath services. These factors are therefore important determinants of the health and nutritional status of household members.

Data collection method. A series of questions is asked to obtain the information shown in the Table.

Findings. *Rural Bangladesh* - Demographic and socio-economic conditions varied considerably between the six divisions. *Dhaka Division* - The percentage of educated mothers (43%) and fathers (44%) was lower than all other divisions except Sylhet Division. The findings for all the other indicators were similar to the national rural average.

Loan for food in the last month (See Fig 1)

What is indicated. A loan for food is a good indicator of household food insecurity in Bangladesh because it is a coping strategy used when a household is unable to produce or purchase sufficient food for consumption.

Data collection method. The respondent is asked whether the household took a loan to obtain food in the last month, either in cash or in kind.

Findings. *Rural Bangladesh* - Overall, 12% of households took a food loan in 2001, ranging from 9% in Jun/Jul to 14% in Feb/Mar and Oct/Nov. *Dhaka Division* - The percentage was lower than all other divisions throughout most of the year.

Homestead gardening (See Fig 2)

What is indicated. Homestead gardening in Bangladesh has been shown to lower the risk of vitamin A deficiency in preschool children and mothers. Households that practice improved gardening techniques consume non-cereal foods more frequently and have a more diverse diet than other households.

Data collection method. Three types of homestead gardens are distinguished: 'traditional' homestead gardens which produce only gourd and traditional types of vegetables seasonally in scattered plots; 'improved' homestead gardens which produce a wider range of vegetables seasonally in fixed plots; and 'developed' homestead gardens which grow a wide variety of vegetables all year in fixed plots.

Findings. *Rural Bangladesh* - In 2001, 76% of households cultivated traditional gardens, 8% improved gardens and 1% developed gardens. *Dhaka Division* - The percentage of households with improved and developed gardens was the same as the national rural average, but a higher percentage of households had traditional gardens (82%).

Breastfeeding of children aged <60 mo (See Fig 3)

What is indicated. Infants and young children should be exclusively breastfed for the first 6 mo of life because of nutritional and health benefits. Breastfeeding should continue well into the second year of life, complemented with nutritious foods from 6 mo of age.

Data collection method. The mother is asked whether her child is currently breastfed.

Findings. *Rural Bangladesh* - Throughout rural

Bangladesh almost all mothers breastfed their children well into the second year of life (97% of children aged 12-14 mo and 88% of children aged 21-23 mo), and many for much longer. *Dhaka Division* - The percentage of breastfed children was similar to the national rural average.

Vitamin A capsule receipt in children aged 12-59 mo (SEE FIG 4)

What is indicated. Preschool children in Bangladesh need vitamin A supplements because their diet does not supply enough vitamin A and so they are at high risk of illness, blindness and dying due to vitamin A deficiency. The Government of Bangladesh currently aims to give every child aged 12-59 mo a high-dose vitamin A capsule (VAC) containing 200,000 IU twice a year at six-monthly intervals during the National Immunization Days for polio. IVACG/WHO also recommend that children aged 6-11 mo be given 100,000 IU vitamin A twice a year. However, these children are currently not included in the national VAC distribution campaigns because the polio vaccine has a target age of 12-59 mo.

Data collection method. The NSP monitors the coverage of the VAC program during a round of NSP data collection that follows a VAC distribution. During the year 2001, the NSP collected data on coverage of the VAC program in Feb/Mar for the November 2000 VAC distribution and in Jun/Jul for the May 2001 VAC distribution. The mother is asked whether her child received a VAC during the most recent distribution.

Findings. *Rural Bangladesh* - Coverage of the VAC program among children aged 12-59 mo increased from around 50% in the early 1990s to almost 90% in the late 1990s. The coverage in November 2000 and May 2001 was 97% and 96% respectively, exceeding all previous years. *Dhaka Division* - Coverage of the VAC program (96-98%) was similar to the national rural average.

Household energy intake (SEE FIG 5)

What is indicated. Household energy intake is used as an indicator of household poverty: households with an energy intake <1805 kcal/person/d are considered 'extreme' or 'hard-core' poor, and households with an energy intake of 1805-2122 kcal/person/d are considered 'moderate' or 'absolute' poor[1]. Household energy intake is also used as an indicator of household food security. However, this indicator neither incorporates the social or environmental dimensions of poverty, nor does it give an indication of the quality of the household diet.

Table *Household demography and socio-economic status in 2001*

		Dhaka Division	Rural Bangladesh
No. household members (mean)		5.2	5.5
Household crowding (median no. household members per 100 sq ft)		2.1	2.2
Female decision-maker (%)		3	4
Functionally landless[a] (%)		67	68
Manual labor as main source of income (%)		21	22
Clean source of drinking water[b] (%)		100	98
Closed latrine (%)		36	39
Parent's education[c]	Mother	43	49
	Father	44	50

[a] Own <50 decimals (2000 m^2) cultivable land
[b] Water obtained from hand pump, deep tube well or tap
[c] At least one year of formal education

Fig 1. *Percentage of households that took a loan for food in the last month in 2001*

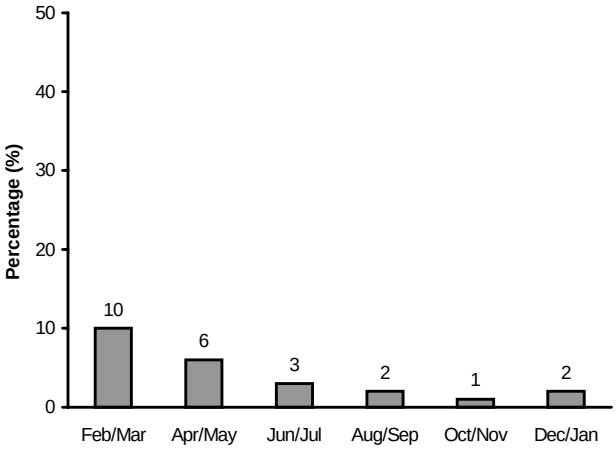


Fig 2. *Percentage of households that participated in homestead gardening in 2001*

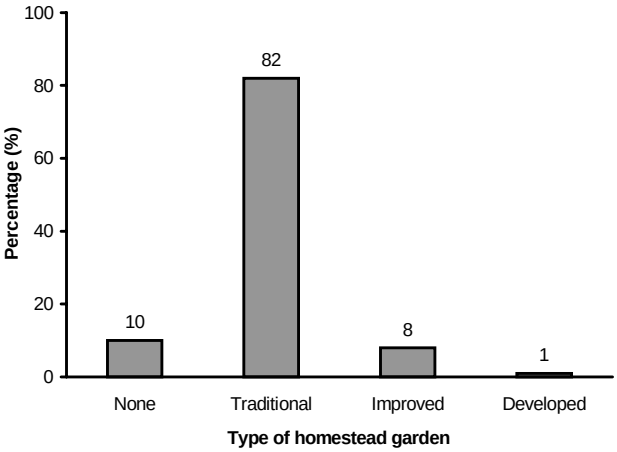


Fig 3. *Percentage of breastfed children by age in 2001*

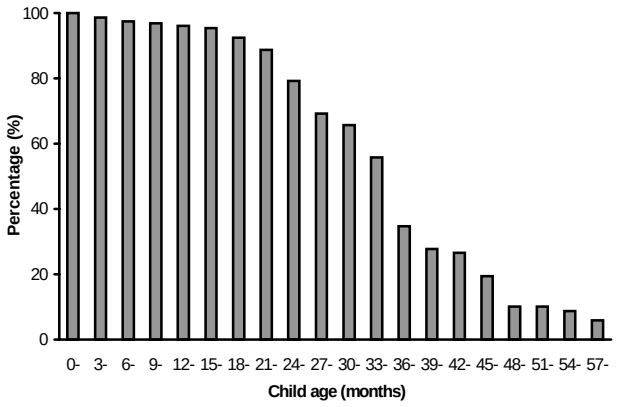


Fig 4. *VAC coverage in children aged 12-59 mo in 2001*

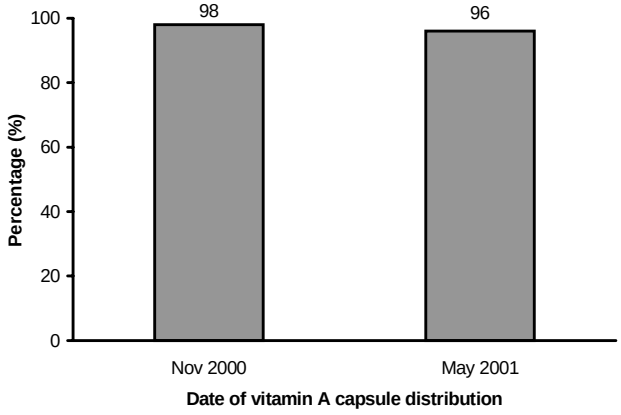
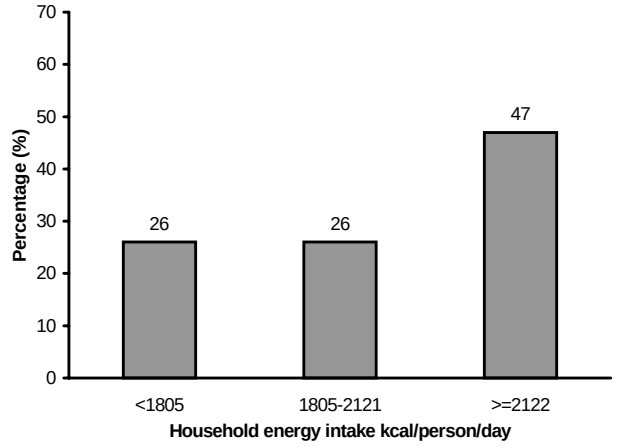


Fig 5. *Household energy intake in Dec 2001/Jan 2002*



Data collection method. Since December 2001, the NSP has collected data on household energy intake using a 7-day list-recall method. The respondent is asked to list all food and beverage items consumed by household members in the previous week and to estimate the quantity of each item consumed. These data are converted to a value of daily energy intake per household member.

Findings. *Rural Bangladesh* - In Dec 2001/Jan 2002, 24% of rural households had an energy intake <1805 kcal/person/d and 23% had an energy intake of 1805-2122 kcal/person/d. *Dhaka Division* - The percentage of households with a low energy intake (<2122 kcal/person/d) was higher than the national rural average (52%). About one-quarter (26%) of households had an intake <1805 kcal/person/d and were considered 'extremely' poor.

Household consumption of non-cereal foods (See Fig 6)

What is indicated. A high quality diet, which contains a diverse range of non-cereal foods that are good sources of micronutrients, reduces the risk of micronutrient deficiencies. One way to assess the quality and diversity of the household diet is to examine how often household members eat non-cereal foods.

Data collection method. The mother is asked to recall on how may days in the last 7 days the household members ate five common non-cereal foods: *dal* (lentils), eggs, green leafy vegetables, yellow/orange fruit or vegetables, and fish. A household is considered to have eaten a non-cereal food 'regularly' if household members ate it on ≥4 days in the last 7 days. As data on this indicator were not collected in Dec 2001/Jan 2002, data from the previous year are included in Fig 6 in order to show seasonal variation throughout the year.

Findings. *Rural Bangladesh* - During most of the year <10% of households ate *dal*, yellow/orange fruits or vegetables, eggs and green leafy vegetables regularly, and 40-70% households ate fish regularly. *Dhaka Division* - Regular consumption of *dal*, green leafy vegetables and fish was slightly above the national rural average, but was still low.

Child and maternal diarrhea (See Fig 7)

What is indicated. Diarrhea is a form of morbidity that is relatively easy to monitor, because it occurs relatively frequently and respondents easily understand its definition. It is also a major cause of undernutrition in developing countries, particularly among young children. The prevalence of diarrhea

reflects hygiene conditions both inside the house and in the neighborhood.

Data collection method. The mother is asked a series of questions to determine whether she and her child had diarrhea in the last 24 hr. Diarrhea is defined as ≥3 loose, watery or mucoid stools in 24 hr.

Findings. *Rural Bangladesh* - The prevalence of diarrhea in mothers ranged from 0.6% in Aug/Sep to 1.3% in Apr/May. The prevalence was about five times higher among children aged 6-59 mo, ranging from 5.5% in Dec/Jan to 7.6% in Apr/May. *Dhaka Division* - The prevalence of diarrhea in children and mothers was lower than all other divisions throughout most of the year. The prevalence peaked in Apr/May in both mothers and children.

Child and maternal nightblindness (See Fig 8)

What is indicated. Vitamin A deficiency is associated with an increased risk of illness and dying and is a leading cause of blindness among children and mothers. Nightblindness is the first clinical sign of vitamin A deficiency and is considered a public health problem in areas where the prevalence in children aged 18-59 mo is ≥1%. For each person affected by nightblindness in a population, there are many more with a low vitamin A level, which increases the risk of illness and dying.

Data collection method. The mother is asked whether she or her child have difficulty seeing and therefore moving around when there is insufficient light, for example, at dusk. Fieldworkers verify that this is due to nightblindness and not to any other sight defect.

Findings. *Rural Bangladesh* - The prevalence of nightblindness in children fell from 3.6% in 1983 to 0.6% in 1997. The data collected in 2001 show that the prevalence (0.21%) has been sustained below the level that signals a public health problem. The prevalence in non-pregnant mothers was also low (0.40%). *Dhaka Division* - The prevalence of nightblindness in both children and non-pregnant mothers was below the national rural average.

Child and maternal anemia (See Fig 9)

What is indicated. The main cause of anemia in most of Bangladesh is iron deficiency. A mother who is iron deficient or anemic during her pregnancy has a greater risk of dying during childbirth and of giving birth to a small baby with low iron stores. Iron deficiency and anemia also impair the growth and learning ability of children, lower immunity to infectious diseases and reduce work capacity and productivity in adults. Anemia is considered a 'severe' public health problem if the prevalence is

Fig 6. *Percentage of households that consumed non-cereal foods regularly (≥4 d in previous week) in 2001. GLV = green leafy vegetables; YOFV = yellow/orange fruits or vegetables*

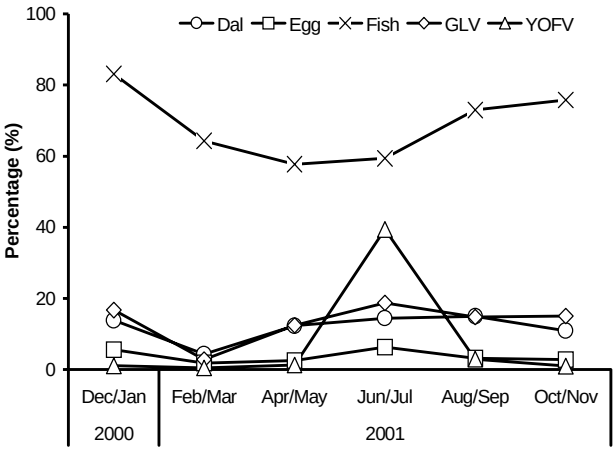


Fig 7. *Percentage of children aged 6-59 mo and mothers with diarrhea in the previous 24 hr in 2001*

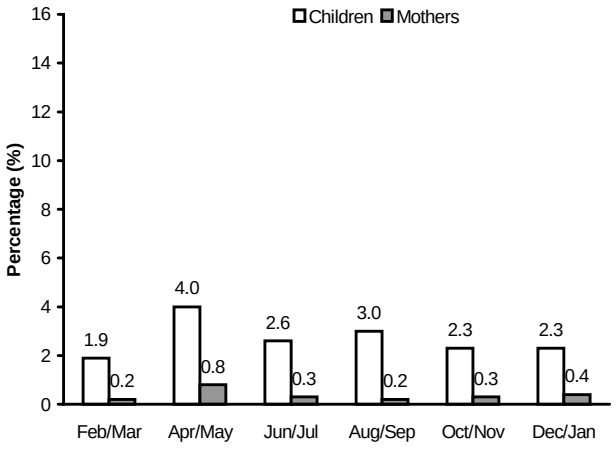


Fig 8. *Percentage of children aged 18-59 mo and non-pregnant mothers with nightblindness in 2001*

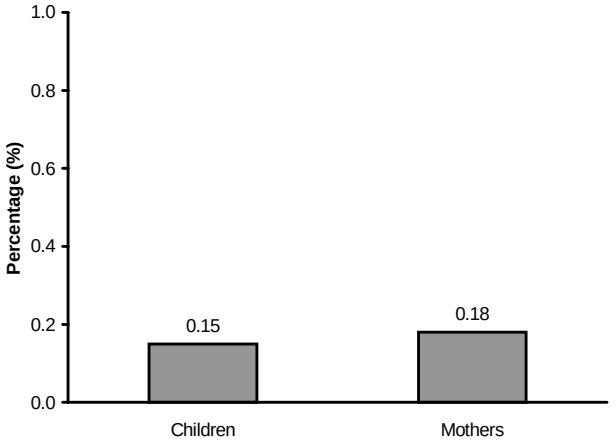


Fig 9. *Percentage of children aged 6-59 mo and non-pregnant mothers with anemia in Oct/Nov 2001*

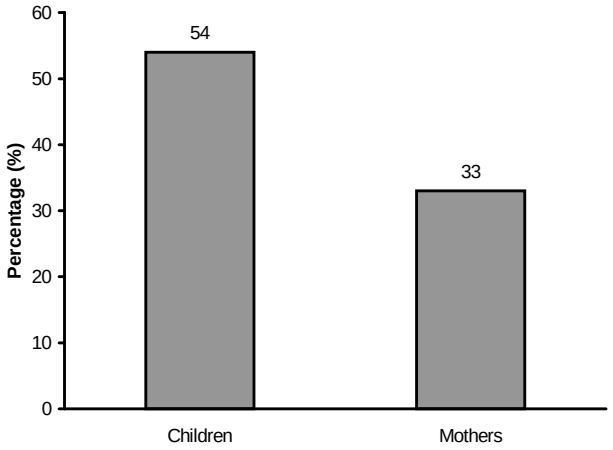


Fig 10. *Percentage of wasted non-pregnant mothers (BMI<18.5 kg/m^2) in 2001*

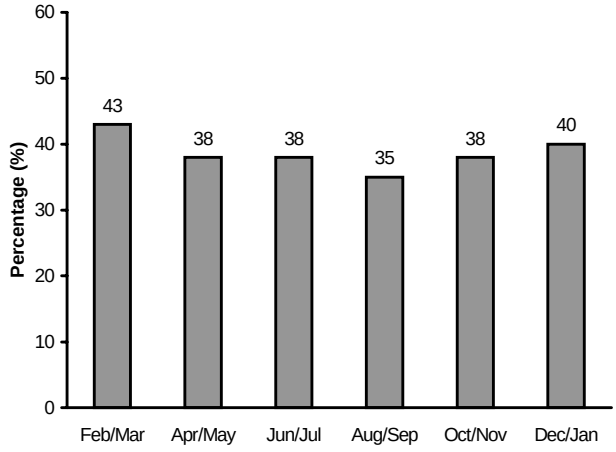
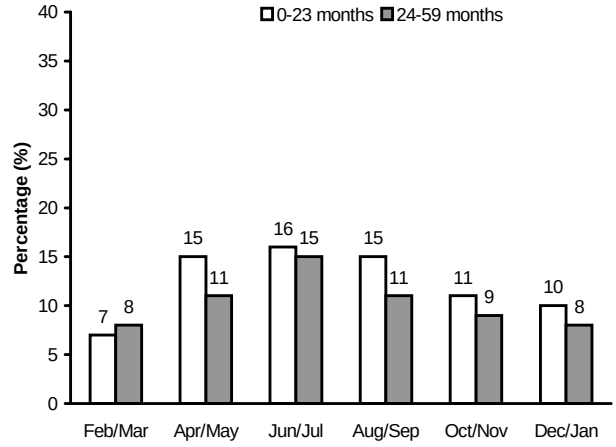


Fig 11. *Percentage of wasted children aged 0-23 mo and 24-59 mo (WHZ <-2 SD) in 2001*



≥40% and a 'moderate' public health problem if the prevalence is 20-39%.

Data collection method. A national anemia survey was conducted by the NSP during routine data collection in Oct/Nov 2001. A drop of capillary blood was taken from the finger of a random sample of 1,148 children and 1,093 mothers, and the hemoglobin concentration (Hb, g/dL) was estimated using a portable hemoglobinometer (HemoCue®). Anemia is defined as Hb <11 g/dL for children aged 6-59 mo and Hb <12 g/dL for non-pregnant women.

Findings. *Rural Bangladesh* - Almost one-half of children (47%) and one-third of mothers (33%) in rural Bangladesh were anemic in Oct/Nov 2001. *Dhaka Division* - The prevalence of anemia in children (54%) was higher than all other divisions, while the prevalence in mothers (33%) was similar to the national rural average.

Maternal wasting (See Fig 10)

What is indicated. Wasting among mothers threatens both their health and survival because it increases their susceptibility to life-threatening diseases and their risk of dying, especially during childbirth. Wasted mothers are more likely to give birth to small infants and to be physically weak. The prevalence of adult wasting indicates a 'critical' food insecurity situation in areas where it is ≥40% and a 'serious' food insecurity situation in areas where it is 20-39%.

Data collection method. Wasting in non-pregnant women is defined as a body mass index (BMI) below 18.5 kg/m^2, which is calculated by dividing body weight by the square of height.

Findings. *Rural Bangladesh* - The prevalence of maternal wasting fluctuated seasonally in rural Bangladesh, ranging from 35% in Aug/Sep to 41% in Dec/Jan. *Dhaka Division* - The prevalence of maternal wasting was similar to the national rural average, except that the peak occurred in Feb/Mar, and indicates 'severe' or 'critical' food insecurity throughout the year.

Child wasting (See Fig 11)

What is indicated. Child wasting (low weight for height) results directly from an inadequate intake of food and/or from diseases. It reflects recent or current nutritional status. The prevalence of child wasting indicates a 'critical' problem in areas where it is ≥15% and a 'serious' problem in areas where it is 10-14%.

Data collection method. Child wasting is defined as a weight for height z-score <-2 standard deviations (SD) of the median of the reference population

(NCHS).
Findings. *Rural Bangladesh* - Between 9-15% of children aged 0-23 mo and 8-14% of children aged 24-59 mo were wasted. The prevalence was highest in Jun/Jul and lowest in Dec-Mar. *Dhaka Division* - The prevalence of child wasting showed a similar pattern to the national rural average, and indicates a 'serious' or 'critical' problem throughout most of the year.

Child stunting (SEE FIG 12)
What is indicated. Stunting (low height for age) results from consumption of a diet of inadequate quality for a prolonged period of time. As stunting takes time to develop, it reflects past nutritional status or chronic undernutrition. A prevalence of ≥40% is considered to be 'very high' and a prevalence of 30-39% is considered 'high'.
Data collection method. Child stunting is defined as a height for age z-score <-2 SD of the median of the reference population (NCHS).
Findings. *Rural Bangladesh* - In rural Bangladesh, 40-45% of children aged 0-23 mo and 50-54% of children aged 24-59 mo were stunted. The prevalence was highest in Feb-Mar and lowest in Aug-Sep. *Dhaka Division* - The prevalence of child stunting was 'very high', on average 4% higher than the national rural average.

Child underweight (SEE FIG 13)
What is indicated. Underweight (low weight for age) can be the result of wasting and/or stunting. A prevalence of ≥30% is considered 'very high'.
Data collection method. Child underweight is defined as weight for age z-score <-2 SD of the median of the reference population (NCHS).
Findings. *Rural Bangladesh* - Between 41-46% of children aged 0-23 mo and 53-61% of children aged 24-59 mo were underweight. The prevalence was highest in Jun/Jul and lowest in Dec/Jan, and was 'very high' in all divisions throughout all the year. *Dhaka Division* - Compared with the national rural average, the prevalence of child stunting was on average 2% higher in children aged 0-23 mo and 4% higher in children aged 24-59 mo.

Fig 12. *Percentage of stunted children aged 0-23 mo and 24-59 mo (HAZ <-2 SD) in 2001*

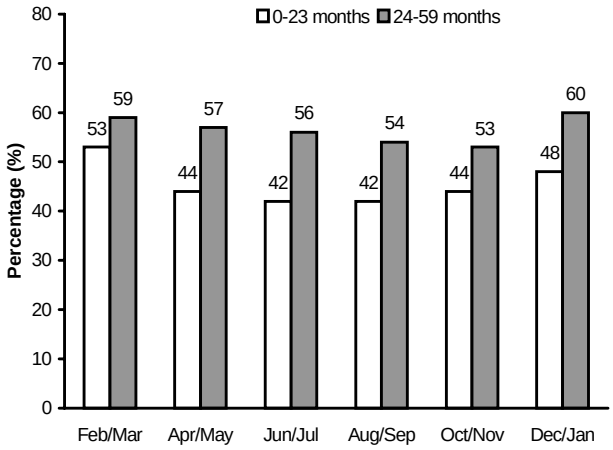
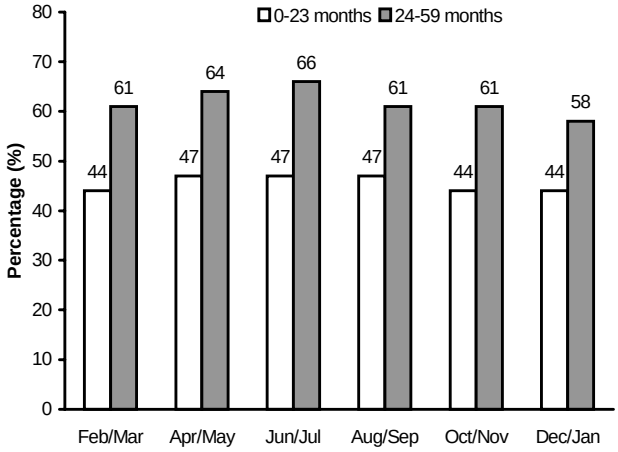


Fig 13. *Percentage of underweight children aged 0-23 mo and 24-59 mo (WAZ <-2 SD) in 2001*



CONCLUSIONS

The NSP recorded substantial improvements in child nutritional status in rural Bangladesh during the 1990s[2], and surveillance in 2001 has shown that these encouraging trends have continued. However, the prevalence of malnutrition in children and mothers is still amongst the highest in the world. Many millions of children and mothers in rural Bangladesh continue to lack sufficient access to food, health care services and a clean environment.

The NSP findings for Dhaka Division in 2001 show that 26% of households had an energy intake <1805 kcal/person/day and were considered 'extremely' poor and a further 26% had an intake of 1805-2122 kcal/person/d and were considered 'moderately' poor. The high prevalence of wasting in mothers (35-43%) indicates a 'serious' or 'critical' food insecurity problem at different times of the year. The prevalence of child wasting (7-16% in children aged 0-59 mo) was also 'serious' or 'critical' throughout most of the year. According to international criteria, the prevalence of child stunting (42-53% in children aged 0-23 mo and 53-60% in children aged 24-59 mo) and

underweight (44-47% in children aged 0-23 mo and 58-66% in children aged 24-59 mo) were 'very high' throughout the year.

The prevalence of anemia in children (54%) was higher than all other divisions and indicates a 'serious' health problem, while anemia was a 'moderate' public health problem in mothers (33%). The VAC program had very high coverage (96-98%) and the prevalence of nightblindness in both children and mothers was below the 1% threshold that indicates a public health problem. The percentage of households consuming *dal*, green leafy vegetables and fish regularly was slightly above the national rural average. However, the very high prevalence of anemia and stunting in children suggests that dietary intake of micronutrients, including vitamin A, is very low.

All necessary resources should be mobilized at all levels to ensure that faster progress is made in reducing malnutrition in Bangladesh in the coming decade. Direct nutrition interventions are needed to assist those affected by malnutrition, including nutritional rehabilitation and direct feeding programs for the severely malnourished; micronutrient supplementation to prevent and control anemia and vitamin A deficiency among those at highest risk, particularly young children and women of child-bearing age; and food fortification to improve the micronutrient status of the population as a whole. All food, agriculture and development policies and programs should place greater emphasis on interventions to improve household food security, including crop diversification, homestead food production, employment and income creation, credit facilities, and food assistance. Infectious diseases such as diarrhea are still a major cause of malnutrition, and so households need a sanitary environment and better access to preventive and curative health services. These interventions should be complemented with poverty alleviation strategies that support labor-intensive economic growth, sound macroeconomic management, good governance and social development, including the empowerment of women, and by global trade policies that stimulate the growth of Bangladesh's economy. Surveillance should be used to monitor the implementation of policies and programs and to assess their impact.

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